


SCOPE

MAGAZINE OF NAVAL MEDICAL RESEARCH AND DEVELOPMENT

JUNE 2024

A photograph of four men standing in a snowy, arctic environment. They are all wearing heavy winter jackets and hats. The man on the far left is wearing a brown jacket and a black face mask. The man next to him is wearing a brown jacket and a blue knit hat. The man in the center is wearing a brown jacket and has ski goggles on his forehead. The man on the far right is wearing a dark blue jacket and a grey knit hat. They are all smiling at the camera. The background shows a snowy landscape with some distant structures.

NAMRU SAN ANTONIO
Tests Treatment
Protocols in the

ARCTIC

SCOPE

MAGAZINE OF NAVAL MEDICAL RESEARCH AND DEVELOPMENT

ISSUE 5 JUNE 2024

Editor's Desk

Welcome, readers new and returning,, to THE SCOPE.

The NMR&D enterprise has enjoyed a successful 2024 so far. In addition to the strides every command continues to make in their health research efforts, we've been fortunate to take part in events across the country and the world. Some of these events are covered in the pages ahead, and some are yet to come as we look forward to Summer!

Hopefully the enterprise's efforts will continue to shine bright among the work done across military medicine.

Thank you to everyone for your accomplishments and high intentions on behalf of our service members and the world. SCOPE is ultimately about celebrating all of you: our Sailors, scientists and staff across every command.

Looking forward to the seas ahead!

—Sidney Hinds

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*The Scope Issue 5 June 2024
is authorized for public release and is published by
Naval Medical Research Command Public Affairs*

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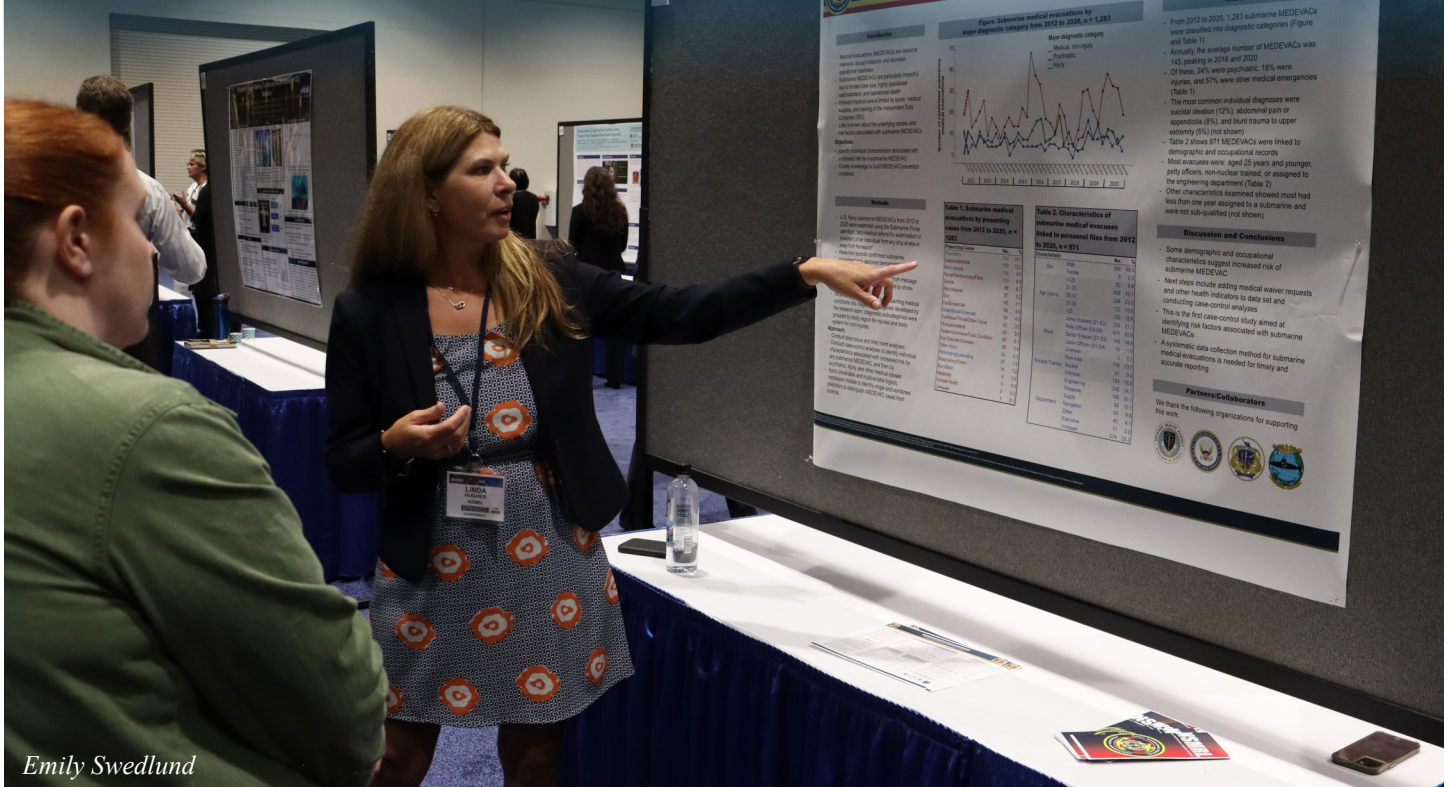
2024 Etter Awards

*NMR&D Commands recognized for
excellence in research and development*

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NAMRU San
Antonio at Arctic
Edge 2024

NSMRL is Dedicated to Women's Health Research



By Emily Swedlund

Throughout Women's History Month, the Navy Medicine Research & Development enterprise highlights efforts to enhance the experience of women in the Navy—efforts such as Naval Submarine Medical Research Laboratory (NSMRL)'s Undersea Health Epidemiology Research Program (UHERP), the only research team in the Navy that studies the health of women divers and submariners.

Women were not always allowed in the submarine environment. It was in 2010 that the U.S. Navy integrated women into the Submarine Force. The decision was controversial—it had been argued that women could not fit into the submarine environment (Boyle, 1999). However, as we look back over a decade later, this decision did not lead to

any lasting negative impacts, and has only continued to increase the available pool of talent within the Submarine Force (Stoner, 2021).

“Our goal is to create actionable knowledge that can directly support Navy operations, training, and Policy development.”

As women started to integrate into the Submarine Force, concerns arose regarding how the submarine environment might affect the health of these new submariners. NSMRL received a tasker directly from the Secretary of the Navy, requesting research on how the psychological and epidemiological aspects of the submarine environment affect women. Out of this request, UHERP was established, and has since grown to study not only the health of women, but to provide critical data analysis that could identify and characterize emerging and ongoing health threats among all Navy submariners and divers.

“Our goal,” said Dr. Brian Maguire, senior epidemiologist on the UHERP team, “is to create actionable knowledge that can directly support Navy operations, training, and policy development.”

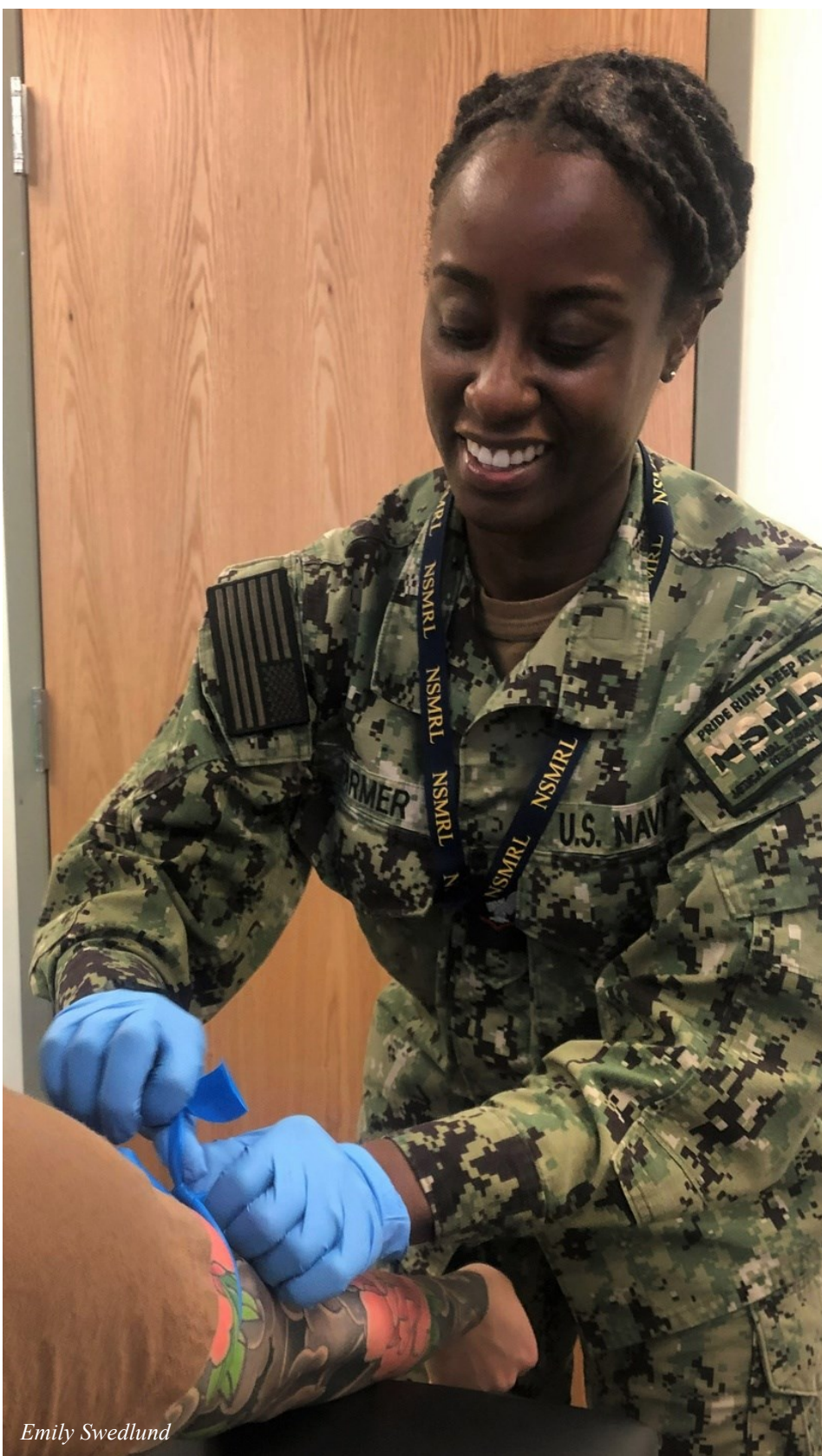
“You have to understand a population before you can make changes,” explained Linda Hughes, UHERP’s program manager, statistician and a founding member of the team, “We have to identify who is at risk, and

what they’re at risk for, and then we can come up with methods to mitigate those risks, whether that’s through changes to medical guidance, to onboard equipment or to screenings.”

To understand how the undersea environment can affect women’s health, UHERP scientists must study the female population of divers and submariners, a relatively small demographic. However small the population, the positive effects of UHERP research has echoed throughout the Submarine Force. In 2022, UHERP won “Best In Show” at the Military Health Systems Research Symposium for their presentation on the health of female divers, which concluded that the risks associated with diving differ between men and women. The results of this one study show the importance of targeted understanding. “The best medicine is prevention,” said Dr. Ben Lawson, NSMRL’s technical director, “and it’s important to know what is causing adverse health outcomes before those risks can be reduced.”

“You have to understand a population before you can make changes”

“We don’t know the long-term effects of our work,” says Dr. Maguire. “It’s our job to find the risks and share that information, which can assist decision-makers who are creating policy or guidelines, and it is our hope that the work we do can inform those decisions.” ■



Emily Swedlund



Senior NMRC Scientist Wins BEYA Stars and Stripes Award

By Mike Wilson

Dr. Kevin Porter, director of Naval Medical Research Command (NMRC)'s Defense Infectious Diseases Directorate (DIDD) received the 2024 Black Engineer of the Year Awards (BEYA) Stars and Stripes United States Federal Agency Leadership Award on Friday, February 16.

The award was presented during the second annual Stars and Stripes award ceremony. The theme of the event centered around the pillars of influence, strength, support and honor.

Porter has worked in infectious disease research since 1990. His career to date includes 23 years of active-duty service in the U.S. Navy, and an additional 12 years as a Navy civilian and director of DIDD, contributing to countermeasures for

and the body of knowledge on infectious diseases of military importance. Under Porter's leadership, the DIDD conducts research on infectious diseases that may negatively impact the health and readiness of deployed service members.

"I am deeply honored to have been selected for this prestigious award"

"I am deeply honored to have been selected for this prestigious award," said Porter, "and truly grateful to my NMRC colleagues who nominated me."

This award ceremony was part of a larger BEYA career day aimed at supporting and advancing diversity

within the STEM fields. This year's conference theme, People, Process, and Technology, underscores ongoing commitment to acknowledging the contributions of Black professionals in engineering. The Stars and Stripes awards are part of BEYA's efforts in recognizing Black excellence in the military.

"The biggest honor is the confirmation that my goals to mentor young active duty and civilian scientists and promote excellence in infectious diseases research and STEM are being reached," Porter remarked.

Porter has the distinction of being Duke University's first-ever Black infectious disease fellow. Spectrum Magazine named him as a Science Spectrum Trailblazer in 2006 for his work in dengue virus research. ■

NMRC Personnel Provide *Biological Warfare Detection Training* Aboard **USS BOXER**

By Mike Wilson



Personnel with Naval Medical Research Command (NMRC) provided training on biological attack response and mitigation to Sailors aboard the amphibious assault ship USS Boxer (LHD 4) from January 24-25.

The training provides shipboard medical laboratory technicians with biological warfare confirmatory detection expertise to enhance a ship's ability to safely manage samples from suspected biological attacks and provide accurate, expedited results to best preserve the health and the readiness of personnel at-sea.

"This training enhances our laboratory technicians' ability to utilize equipment on board to expeditiously and safely identify potential biological and chemical weapons that may be directed at our ship," explained Lt. Cmdr. Paul Flood, senior medical officer for the Boxer.

"Expeditious identification helps the damage control team posture the ship in the best CBRNE defense and allows the medical team to provide life-saving treatments. Any significant delay can have lasting impacts on sailors and marines on board."

"I hope that the team never has to utilize the training that is being conducted," Flood added, "but I know that the team that we have on board is more than capable of answering the call should the need arise."



MC2 James Finney

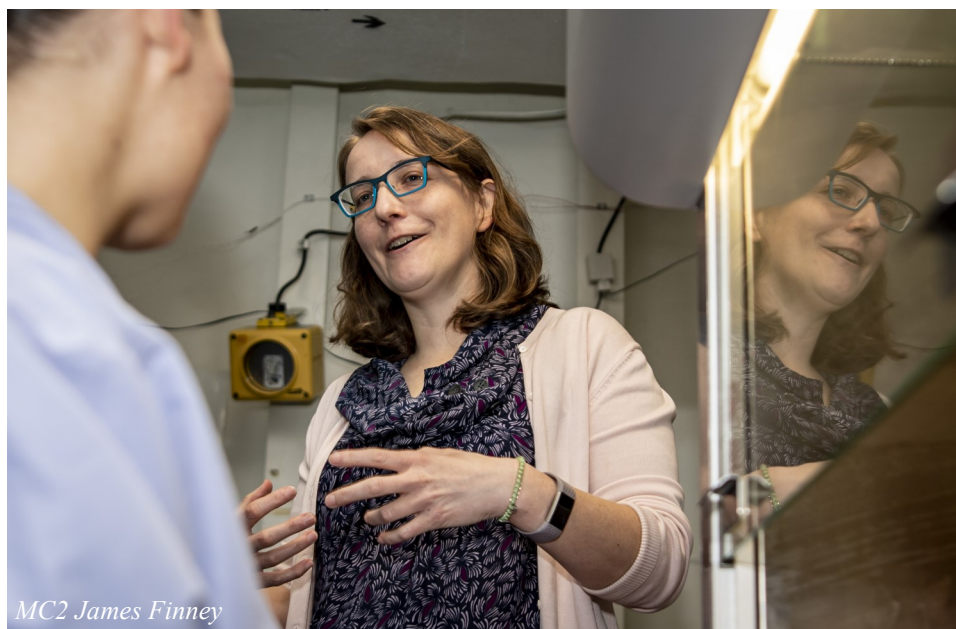


Shipboard medical personnel undergo a range of drills and exercises, to include mass casualty response, chemical, biological, radiological, and nuclear defense and medical evacuation. Boxer's medical department, and those on other ships that receive biological warfare training from NMRC's Biological Defense Research Directorate (BDRD), are taught Next Generation Diagnostic System (NGDS)

“When we visit the ship, our objective is to make sure that NGDS system has a current software system, and that the ship has received unexpired reagent and supplies”

proficiency testing. The NGDS system is used to test for unknown biological warfare agents while ships are operating out at sea or out of foreign ports.

“When we visit the ship, our objective is to make sure that NGDS system has a current software system, and that the ship has received unexpired reagent and supplies,” explained Chief Hospital Corpsman Shiva Giri, one of the NMRC instructors. “We also refresh laboratory technicians’ proficiency testing skills and make sure that their biological warfare agent testing capacity is running well while away from home port.”



MC2 James Finney

The BDRD team, located at Ft. Detrick, works to advance research and development of therapeutics to protect against biological attacks. BDRD trainers perform five to seven visits to ships every year to provide testing and training, furthering the Navy Surgeon General line of effort to provide quality healthcare and patient safety across the entire Naval force. ■

ARCTIC EDGE

PO2 Ace Foster



A FIRST: NAVY MEDICINE TESTS TREATMENT PROTOCOLS IN THE ARCTIC

Story by
Burrell Parmer

Operating in extreme arctic temperatures can be extremely challenging, and performing Tactical Combat Casualty Care (TCCC) treatment becomes even more difficult as casualties donning large amounts of clothing layers can make wound assessment and applying medical care, such as tourniquets, much more problematic.



To evaluate seven common TCCC treatment protocols, four research scientists and biomedical engineers assigned to Naval Medical Research Unit (NAMRU) San Antonio's Combat Casualty Care and Operational Medicine Directorate participated in Arctic Edge 2024 at Joint Base Elmendorf-Richardson, Anchorage, Alaska, March 3-8, and Operation Ice Camp 2024 on the Beaufort Sea, approximately 200 nautical miles north of Deadhorse, Alaska, March 16-21.

According to Dr. William D'Angelo, the lead biomedical engineer assigned to NAMRU San Antonio's Biomedical Systems Engineering and Evaluation Department, treatment protocols have evolved from operations in Iraq and Afghanistan, but it is not known how those protocols will function in extreme cold environments.

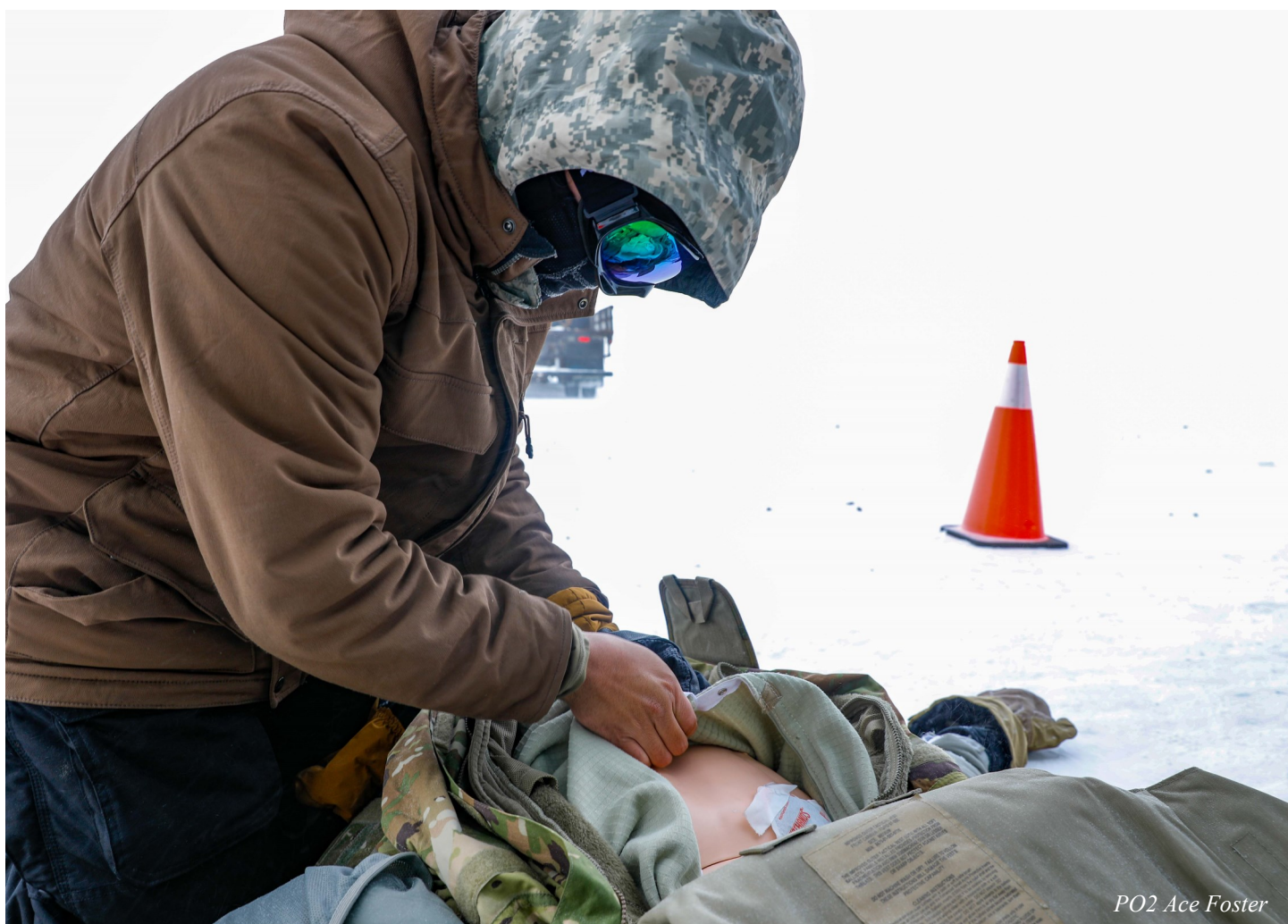
"During Arctic Edge and Operation Ice Camp, we had a TCCC-trained caregiver perform treatment protocols on a trauma manikin with simulated injuries," said D'Angelo. "Each procedure was broken down to its core steps with the caregiver and trauma manikin outfitted in appropriate extreme cold weather clothing. The aid bag was always kept outside so the medical supplies were cold soaked."

D'Angelo said a go/no-go task analysis process was used to determine the feasibility of each step, from the perspective of the caregiver, the casualty, and the supplies. "The number of no-go steps, the time it takes to perform the procedure, and the provider's hand temperatures were measured and compared to baseline data," D'Angelo explained. "The resulting data was

collected to inform extreme cold weather treatment guidance, and for use in future research and development efforts."

Arctic Edge 2024 is a U.S. Northern Command-led homeland defense exercise demonstrating the U.S. military's operating capabilities in extreme cold weather conditions, joint force readiness, and U.S. military commitment to mutual strategic security interests in the arctic region.

Previously known as Ice Exercise (ICEX), Operation Ice Camp is a three-week operation hosted by U.S. Submarine Forces in collaboration with the Arctic Submarine Laboratory (ASL), and is designed to research, test and evaluate operational capabilities in the unique environment of the arctic region. ■



PO2 Ace Foster



Navy Microbiologist Participates in DODEA-Europe Junior Science and Humanities Symposium

Lt. Cmdr. Robert Hontz, a microbiologist and health research scientist with Naval Medical Research Unit (NAMRU) EURAFCENT's Ghana detachment, participated as a judge at the Department of Defense Education Activity (DoDEA) Europe Junior Science and Humanities Symposium (JSHS) from February 28-29.

Hontz attended fourteen high school student presentations, joined by four other judges specializing in computer science, artificial intelligence, bioengineering and astrophysics.

Judges asked student participants questions to evaluate their ability to think critically about their chosen research topic. Following the presentations, judges conferred and critiqued students based on project content, presentation slides, oral delivery and ability to answer panel

questions. Each presenter was given time with the judges to receive encouragement, constructive feedback and mentoring to help them improve in their research projects.

Five students received an invitation to attend the national competition in May. The most outstanding presentations and posters from regional competitions compete at the national competition in Albuquerque, New Mexico, May 1-4.

In keeping with the Navy Surgeon General's line of effort to recruit and retain skilled Navy Medicine shipmates, Hontz delivered a 45-minute talk to students about his journey from high school to service as a scientist in the U.S. Navy. He also sat down with student participants to discuss their educational journeys, interests and future career goals and aspirations.

"Events like this are critical for instilling a love of science in the next generation," said Hontz. "I was grateful for this opportunity to see amazing science projects from incredibly talented young people. I hope to make attending JSHS a recurring event and return as a judge for years to come."

This year's JSHS included over 30 students and their faculty mentors from DoD schools in the European region, all of whom applied for the chance to participate in either the oral or poster competition.

DoDEA holds the JSHS annually for high school students enrolled at Department of Defense Schools worldwide. This venue offers students the opportunity to present original research projects in oral or poster format to a panel of professional scientists for the chance to earn college scholarships. ■



NMR&D Enterprise Scientists and Research Recognized at 2024 Etter Awards

By Mike Wilson

Researchers from the Navy Medicine Research and Development enterprise were recognized at the annual Assistant Secretary of the Navy, Research, Development and Acquisition Dr. Delores M. Etter Top Scientists and Engineers Awards Ceremony, held at the Pentagon on June 12th.

The awards, presented to scientists and engineers who have demonstrated superior accomplishments throughout the year, recognized Naval Submarine Medical Research Laboratory (NSMRL)'s Regional Hearing Conservation Program (RHCP) with a 2024 Engineer Team award, and Dr. Michael Red-

dix, a senior research psychologist at Naval Medical Research Unit (NAMRU) Dayton with a Top Scientist award.

“To have two of our commands recognized for outstanding work means a lot for us, and for Navy Medicine.”

“The enterprise is so often underrepresented in these Navy and DoD-wide awards,” said Capt.

Franca Jones, enterprise commander. “To have two of our commands recognized for outstanding work means a lot for us, and for Navy Medicine.”

Comprised of Dr. Stephanie Karch, Dr. Jeremy Federman and Mr. Derek Schwaller, the RHCP team leads Navy efforts to incorporate hearing protection device (HPD) fit-testing for service members across the entire DoD. The RHCP collaborates with other services, like the U.S. Marine Corps, to validate their experimental HPD fit-training method. These trainings teach users to properly fit and use their hearing protection.



“It’s absolutely an honor,” Karch said. “Sometimes we just twirl away working on the little things day-to-day, and don’t get to see the big result until years later. It’s nice to be recognized for the big accomplishments, and all the work that happened along the way.”

Force’s Air Force Research Laboratory on Wright-Patterson Air Force Base, Ohio, to evaluate these pilot spectacles and their efficacy, leading to their growing availability, not only for DoD mission partners, but

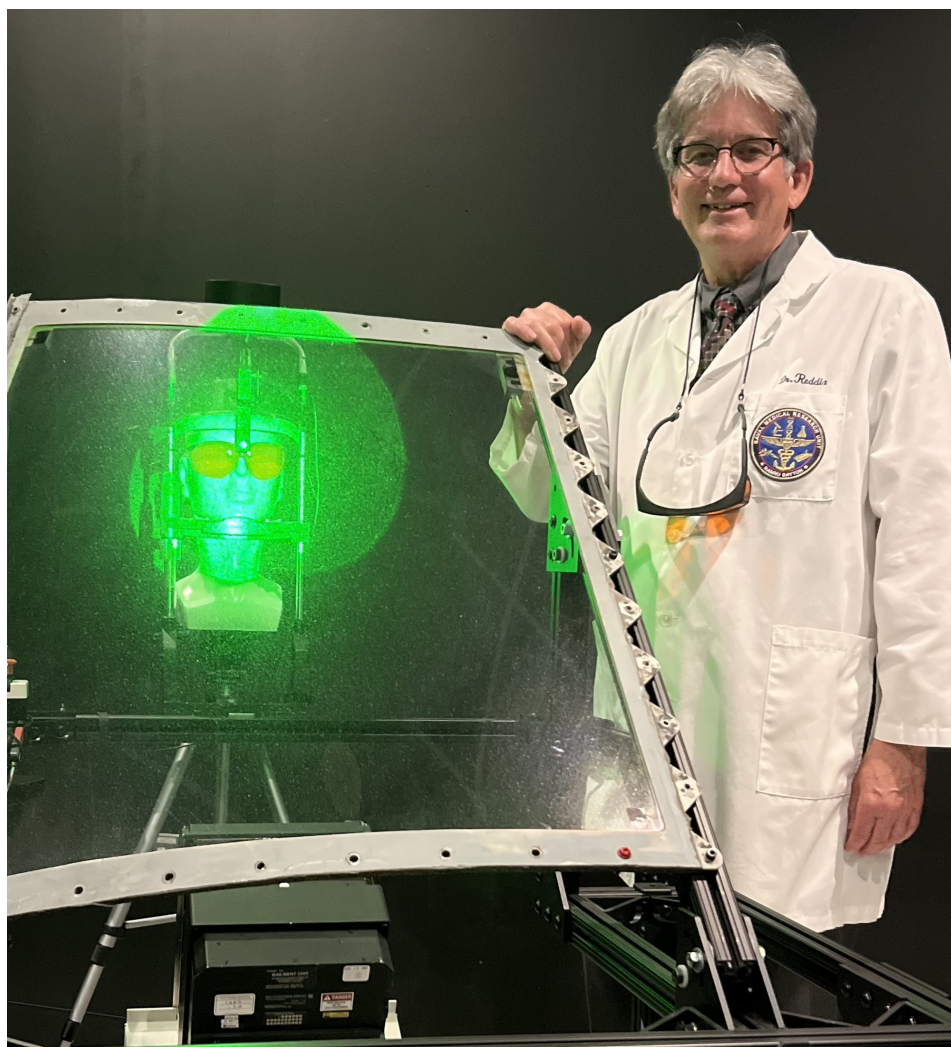
also for the larger commercial aviation industry. The eyewear protects pilot visualization of cockpit instruments against the threat of lasers and laser-based weaponry, without detrimentally affecting crew performance.

“It’s always a team effort,” Reddix, a retired Naval airspace experimental psychologist, observed. “I can’t tell you how much I appreciate my Navy teammates, uniformed and civilian, who helped us get here.”

The Etter awards, presented annually, are named after former U.S. Deputy Under Secretary of Defense for Science and Technology Dr. Delores M. Etter. Etter herself made a statement at the ceremony via a pre-recorded message, thanking this year’s 91 recipients, and hailing them as role models. ■

*“I can’t tell
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here.”*

Reddix and his team at NAMRU Dayton led the research, development, field testing and acquisition of laser eye protection spectacles for pilot use. NAMRU Dayton collaborated closely with the U.S. Air





NAMRU SOUTH CONDUCTS ONGOING FEBRILE AND RESPIRATORY DISEASE SURVEILLANCE

By Cmdr. Marshall Hoffman

Researchers from U.S. Naval Medical Research Unit (NAMRU) SOUTH have an ongoing collaboration with several local Peruvian hospitals to surveil pathogens that are known to cause febrile (having to do with fever) and respiratory diseases, such as dengue, malaria, influenza and COVID-19, in Peru and other partner nations in Central and South America.

The aim of these studies, funded by the Department of Defense Global Emerging Infections Surveillance (GEIS), is to identify the specific causes of acute respiratory and febrile illnesses found in patients at military and civilian health facilities across the U.S. Southern Command (SOUTHCOM) area of operations (AOR), and better address the healthcare needs of those affected. Such illnesses pose a threat to the readiness of U.S. and partner nation service members in countries across the globe.

On a monthly basis, or sooner if a new circulating pathogen or outbreak is detected, NAMRU SOUTH shares its data with the local Ministry of Health, GEIS and relevant collaborators, including academia and non-governmental organizations.

NAMRU SOUTH performs infectious disease surveillance at military and civilian hospitals throughout Peru in Lima, Cusco, Iquitos, Trujillo and Tumbes, in addition to Honduras, Panama, Guatemala, Colombia and Paraguay. The command collects biological samples from people with acute respiratory or fever symptoms and analyzes them for pathogen identification and detection of genetic markers of antiviral resistance. Since 2010, more than 50,000 samples have been collected and tested.



“We can inform the U.S. and Peruvian militaries about disease-causing pathogens that are currently circulating, and genetic markers that can render the pathogens less sensitive to certain medications,” explained Dr. Yeny Tinoco, principal investigator of NAMRU SOUTH’s Acute Respiratory Infections surveillance study.

Headquartered in Lima, and with surveillance activities across Central and South America, NAMRU SOUTH contributes to the world’s understanding of infectious diseases in Peru and beyond. The command’s activities recently discovered the migration pattern into Northern Peru of the Oropouche virus, which is spread by mosquitos and causes a febrile illness. Additionally, NAMRU SOUTH recently completed genome sequencing and molecular analysis of a highly pathogenic (meaning an illness caused by a bacteria or virus) avian influ-

enza A(H5N1) virus provided by the Peruvian Ministry of Agriculture, aiding the first confirmation of a case of highly pathogenic avian influenza virus A(H5N1) in Peru. The results from this analysis were key to helping the National Service of Agrarian Health (SENASA) declare a health alert throughout Peru. NAMRU SOUTH and SENASA continue to collaborate in the monitoring of influenza viruses in animals in Peru.

“Surveillance data serves as the foundation for determining risks to military service members in Central and South America.”

These activities are part of GEIS biosurveillance efforts to inform decision-making and ensure Force

Health Protection by assessing of the presence of animal influenza viruses with pandemic potential circulating in the SOUTHCOM AOR. The studies have detected new viruses and virus variants, identified new geographic locations of existing arboviruses and respiratory viruses and provided early detection of outbreaks.

“Many of the surveillance sites do not have the means to perform laboratory diagnostics and rely only on clinical diagnoses,” said Dr. Julia Sonia Ampuero, principal investigator of NAMRU SOUTH’s Febrile and Vector-Borne Infections surveillance study. “Surveillance data serves as the foundation for determining geographic and temporal risks to military service members in Central and South America, and increases our understanding of the true burden of these diseases.” ■



Navy Medicine R&D Researchers Participate in National Academies Undersea Medicine Workshop

By Tommy Lamkin

Researchers specializing in undersea medicine from the Navy Medicine Research & Development (NMR&D) enterprise participated in a virtual workshop hosted by the National Academies of Sciences, Engineering and Medicine (NASEM), and sponsored by the Office of Naval Research (ONR) on March 21.

The workshop, titled “Emerging Science and Technology to Address Naval Undersea Medicine Needs”, was structured to foster engagement between a wide range of subspecialties, in order to advance undersea medicine as a whole, and best meet the operational needs of the U.S. Navy. Workshop participants included a multi-disciplinary group of experts specializing in a range of

undersea medicine areas, including diving injuries, hyperbaric physiology, submarine medicine, systems engineering, DoD policy and budget and naval operations.

“Brief framing talks for selected discussion topics set the stage for a broader discussion of the topic, such as dive monitoring and injury prevention or submarine medicine,” said workshop chair Dr. Kenneth W. Kizer, a 25-year member of the National Academy of Medicine, a Navy-trained diver and former undersea medical officer. “After these talks, a panel of experts from different, but related, lines of work would respond to with thoughtful reflections and probing questions about the work’s implications, future directions, challenges and opportunities.”

The workshop featured NMR&D researchers from the Naval Submarine Medical Research Laboratory (NSMRL) and Naval Medical Research Command (NMRC), alongside representatives from across the undersea medicine, diving, and submarines communities within ONR, the Navy Bureau of Medicine and Surgery and Naval Sea Systems Command, among others.

“This workshop is unique,” explained Dr. David Fothergill, NSMRL science director. “It brings the operational diving and the submarine line community together with researchers from both military laboratories and universities to discuss where cutting edge research in undersea medicine can best be focused to ultimately help our undersea warfighters.”

Fothergill, a Navy-trained diver with more than 30 years of experience in undersea research, was joined by his NSMRL colleagues: Dr. Jeffrey Bolkhovsky, winner of the 2023 Navy Emergent Scientist of the Year Award, who specializes in human performance; Dr. Justin Handy, who studies the impacts of stress and resilience on mental health; Dr. Dominica Hernandez, who works to modernize submarine health screening and assessments; and Linda Hughes, program manager for the Undersea Health Epidemiology Research Program.

The enterprise conducts research in several areas in the undersea domain to include; understanding microbiome changes for prolonged submarine deployments; evaluating the effects of underwater exercise; evaluating technology that studies the impact of diving on vestibular reflex function, light treatment countermeasures, such as blue light to aide in circadian misalignment; sleep studies, particularly in relation to submarine watchbill rotations; ongoing atmospheric monitoring of submarines; blast exposure; the evaluation of the sensitivity and reliability of exhaled nitrous oxide as a non-invasive biomarker; psychological fitness, and the investigation of oxygen toxicity.

Dr. Aaron Hall, a research physiologist with NMRC's Undersea Medicine Department, gave an overview of central nervous system and pulmonary oxygen toxicity, discussed identifying the role of nitric oxide in oxygen toxicity and spoke about notable achievements in the 20 years since this type of undersea medicine research program review last occurred.

"This is the most expertise in undersea medicine in one setting in a long time," said Hall. "This workshop represents a gathering of major sponsors, performers, end users and program managers to discuss

Undersea Medicine research as it stands now, and where it should go in the future."

"NMRC serves a vital role in transitioning promising basic research into more mature products for the human research labs to study" Hall added. "This workshop amplifies my research by giving an up-to-date assessment of research gaps, in addition to sponsor and end user input, to make my research portfolio more relevant to the diver and submariner needs."

"NMRC serves a vital role in transitioning promising basic research into more mature products for the human research labs to study."

According to Kizer, much has changed in the two decades since the last similar review of undersea medicine research priorities. For example, the scientific understanding of some diving-related diseases has significantly changed, to include very recent data showing unexplainable marked variation in an individual's risk of decompression sickness when diving the same dive profile on different days. Likewise, new research methods being used to investigate other medical problems, like the use of machine learning and artificial intelligence, hold promise for better understanding a variety of diving and submarine medical concerns. Similarly, there have been significant changes on the operational front, including changes in watch duration when deployed, and women serving on submarines.

Hughes participated in a workshop

discussion focused on potential health concerns of women divers and submariners and the unique research being conducted on those serving in these undersea roles, particularly in the areas of mental health, circadian rhythm and the female reproductive system.

"While some studies on these topics have been conducted on male submariners, and have yet to reveal any long-term effects, no studies have been conducted on female submariners," said Hughes. "It's been 13 years since women were assigned to U.S. subs and they're now assigned to all sub classes and their population is growing exponentially. So now we have a somewhat robust population large enough to study, ideally, from pre-first deployment to beyond separation and long-term effects."

For Kizer, a member of the Uniformed Services University's Board of Regents, prioritizing research projects is key when looking for the best opportunities to lead, leverage and enable research and development.

"Where might there be low-hanging fruit or which knowledge gaps should be filled first because of their likely benefit on undersea warfighter and fleet performance? These are questions we explored."

"This workshop directly relates to NSMRL's mission to sustain the readiness and superiority of our undersea warfighters through innovative health and performance research," added Fothergill. "This is a preeminent virtual workshop specifically focused on undersea warfighters, and is so necessary to define areas of research that are sorely needed to improve warfighter performance."

A formal report of the workshop's proceedings will be available from NASEM later this year. ■

LOOKING *At*

with **André B. Sobocinski**
Historian, Bureau of Medicine and Surgery



From Nuclear Fallout to Atomic Medicine: Notes on Navy Medical Research in the Cold War



On the Walter Reed National Military Medical Center campus in Bethesda, Md., there is a relic from the Cold War that few people have ever seen. Six feet below the surface, there is a fallout shelter that is a palpable reminder of the nation's fear of nuclear war in the Cold War. And in 1962, this subterranean space would be the setting for a unique study on confinement and habitability led by the Naval Medical Research Institute (NMRI, a forerunner of today's Naval Medical Research Command).

As tensions grew between the U.S. and the Soviet Union in the early 1960s, President John Kennedy publicly advocated for the construction of "community shelters" leading to what some have called a "fallout shelter craze." It is estimated that there were over a thousand shelters constructed in the Washington, D.C. metro area, and hundreds of thousands of shelters built across the United States.

Overseeing the nationwide fallout shelter program was the Department of Defense's Office of Civil Defense (OCD). OCD, formerly the Office of Defense and Civilian Mobilization, was responsible for "limiting damage" to the U.S. population in case of nuclear fallout. In conjunction with the Army's Corps of Engineers and the Navy's Bureau of Yards and Docks (forerunner of the Navy Facilities Command), the OCD surveyed existing public shelters, ensuring that they were up to standards, stocking them with requisite food and supplies, and marking them with those ever-distinctive signs adorned with three yellow triangles in a black circle. In 1962 alone, OCD procured some 1.4 million of these fallout shelter signs—one million steel signs for indoors and 400,000 aluminum signs for outdoors.

As part of this effort, in January 1962, the Bureau of Yards and Docks constructed an "experimental" shelter at the Na-

tional Naval Medical Center (NNMC). Measuring 25 feet wide x 48 feet long x 12 feet high, this shelter was in essence an underground Quonset hut covered in 10-gauge galvanized corrugated steel and reinforced by concrete. It was designed to withstand a blast of 75 psi (pounds per square inch) and be resistant to fire, radiation and radioactive fallout.

In February 1962, the Bureau of Yards and Docks, the Naval Medical Research Institute (NMRI) and the Naval Research Laboratory collaborated on a 2-week study to evaluate the habitability of this structure. Research subjects were selected from a pool of naval seaman apprentices who had just graduated basic training at the Naval Training Center Great Lakes, Illinois. Of the 283 volunteers, 150 were selected to undergo physical and psychiatric examinations; 96 of these individuals—mostly teenagers—were selected for the study.



The research subjects entered the shelter on February 17th and were joined by a Navy physician, two hospital corpsmen and an engineer, who served as “monitors.”

For two weeks (the estimated time radioactive fallout would prove the greatest threat) these subjects were confined under the watchful eye of a camera that transmitted to a video monitor at NMRI. Inside, subjects had access to water supplied by a 4,000-gallon storage tank; and six chemical toilets partitioned off by canvas curtains and 50 bunks.

The bunks, which took up half the living space, were positioned in two longitudinal rows running five deep and stacked five high. It was reported that each subject had about “one-tenth of the livable space available aboard a submarine.” And like submarines, each participant was expected to “hot-bunk,” i.e., sharing their beds in shifts.

Power was supplied by a 10-kilowatt diesel generator located outside the shelter; generator fumes were vented through a 2.5-inch steel pipe. Although the shelter was equipped with a ventilation system designed to remove atomic, biological, and chemical agents, there was no artificial heat.

Hygiene and sanitation were cer-

tainly issues. The shelter was supplied with 5,600 packets of wet napkins (water was not permitted for washing), six tubes of toothpaste, 25 packages of paper towels and 13 gallons of chemical for the six toilets. Subjects were only permitted the clothes they wore going into the shelter and one change of socks. Each subject was expected to live on 2,000 calories a day provided by standard shelter rations of enriched crackers, dried soup, chocolate, coffee, tea, powdered milk, jam, and peanut butter.

To offset the tensions likely to arise under these conditions, the shelter was supplied with games (playing cards, pinochle decks, dominoes, checkers, Scrabble, cribbage boards, Bingo cards and four chess sets) as well as reading material (200 magazines, and 200 paperback

books). Subjects also had access to paper pads, pens, pencils; and each were encouraged to keep diaries for the length of stay.

Smoking, then ever-present at naval facilities, was allowed. Research subjects were permitted to bring their own cigarettes and matches; additional packages of cigarettes were supplied when needed.

Despite boredom and cramped conditions most subjects later reported that morale remained high throughout the study. The biggest complaints were the close confinement, lack of “appetizing food” and the noise levels due to snoring (which was reported to reach up to 70-78 decibels.) Respiratory infections and colds would also prove to be an issue during the trial. ■





For Hospital Corpsman 2nd Class (HM2) Alejandra Ramirez Alarcon, giving back to her community has always been essential. Ramirez recently volunteered to participate in the annual Career Day events at Sargent Shriver Elementary School and Weller Elementary School on February 23, 2024, and April 19 2024 to speak with students and share her experience as a Sailor in the U.S. Navy.

The students were excited to learn that I spoke Spanish; every kid I spoke with shared where they were from and asked me why I joined the Navy. I told them it was because of my love for taking care of others, especially the sick, and for the enriching opportunities to travel the world. I'm incredibly proud of my roots as a Spanish-speaking, Latin-American woman; and it was great to be able to use that to make a connection with all of the Spanish-speaking kids, and share my experience as a Sailor, and working in Navy Medicine.

I shared the travel opportunities I had with the students, including an

18-month tour to the Naval Medicine Readiness and Training Unit Bahrain, and the opportunities to visit Abu Dabi, Dubai, Italy, Morocco, Oman and Senegal. I even had an eager third grader from Peru ask me about my favorite part of being in the Navy, and in Spanish I mentioned to him traveling to all these places, making new friends, and trying different foods. He told me that he also wanted to join the Navy when he gets older, to see the world and care for other people.

I was able to share this experience with several of my colleagues, Ms. Jenetta Green, Lt. Rafe Khan, Lt. Cameron Sayer, and Lt. Cmdr. Sa-

rah Jenkins. Their presence and their own interactions with the students reminded me of the incredible work done in their respective fields within NMRC. By sharing our experiences the five of us are helping to pave the way for Navy medicine's future.

The Navy has given me a platform to explore what the world has to offer, serve my country, and be an ambassador for diversity. Our participation in local communities as sailors is critical to developing relationships with leaders, parents and children, and to offering an insight into the possibilities that the Navy offers. ■

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A closer look at Navy Medicine's R&D enterprise



SAN ANTONIO (Feb. 8, 2024)

Capt. Franca Jones, commander, Naval Medical Research Command, held an enterprise all-hands call at the Military and Family Readiness Center during her visit to Naval Medical Research Unit San Antonio. Jones spoke on numerous topics including the National Defense Authorization Act, the recent Deputy Secretary of Defense Memorandum, and the research and development relationship with the Defense Health Agency. Personnel across the NMR&D enterprise joined virtually.

— *Burrell Parmer*

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FREDERICK, Md. (April 24, 2024) Hospitalman Catherine Estrada speak with attendees at the 2024 Spring Research Festival. NMRC was represented by research posters

and a booth where attendees could learn about work underway at the command, and throughout the larger Navy Medicine Research & Development enterprise. — *Sidney Hinds*



SAN ANTONIO (May 23, 2024) Staff with Naval Medical Research Unit San Antonio share food and company during a command Memorial Day cookout. — *Burrell Parmer*



SIGONELLA, Italy (April 16, 2024) Capt. Franca Jones and Capt. Virginia Blackman, alongside leadership at Naval Air Station Sigonella, cut a ribbon at the dedication ceremony for the newly opened NAMRU EURAFCENT headquarters building. — *Cullen Munger*



SILVER SPRING, Md. (April 19, 2024) Lt. Cameron Sayer, a research scientist from Naval Medical Research Command, answers questions about medical research from Weller Road Elementary School students at the school's annual Career Day event. Representatives from NMRC spent the morning with 3rd, 4th and 5th graders, answering questions about STEM, discussing their careers as Navy Medicine researchers and demonstrating laboratory equipment for the children in attendance. — *Sidney Hinds*

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DAYTON, Ohio (Jan. 29 2024) Brig. Gen. Jon Bogart, 711th Human Performance Wing commander (left), Dr. Joni Arnold, 711th HPW science director and deputy commander, and Chief Master Sgt. Esteban Salazar, 711th HPW command chief master sergeant (right) receive a briefing from at the Naval Medical Research Unit Dayton. General Bogart and his leadership team visited NAMRU Dayton to learn more about the command's unique mission portfolio and to discuss areas of collaboration and future partnership opportunities.

— Zach Wilson



SILVER SPRING, Md. (April 08, 2024) Lt. Ha Choe and Lt. Jessy Calderon, with Naval Medical Research Command, observe a partial solar eclipse through protective eyewear. Several command staff, along with their counterparts at Walter Reed Army Institute of Research, took time to view this rare phenomenon on the back patio of the Daniel K. Inouye building. — Sidney Hinds



FREDERICK, Md. (Jan. 12, 2024) Andrea Luquette, with NMRC's Biological Disease Research Directorate, conducts library prep for DNA sequencing. Genome sequencing provides infectious disease data that help NMRC scientists identify rare disease variants, trace the origin and spread of outbreaks, identify whether a given microorganism is resistant to medical countermeasures, and if so, identify which genes make the organism resistant. — Mike Wilson



LIMA, Peru (March 03, 2024) Staff with Naval Medical Research Unit SOUTH discuss jobs in STEM as part of a "Women in Sciences" panel held during Women's History Month. Panelists also took questions from attendees on the research done by the command, and on their personal experiences working in the Navy, their career paths, and military medicine at large. — Courtesy Photo

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SAN DIEGO (May 08, 2024) Dr. Rachel Markwald, a senior research physiologist with Naval Health Research Center, and Principal Investigator for the Command Readiness, Endurance and Watchstanding (CREW) program, briefs Vice Adm. Brendan McLane, commander of Naval Surface Forces, U.S. Pacific Fleet at the NHRC Sleep, Tactical Efficiency, and Endurance Laboratory (STEEL) in the Warfighter Performance Department. Markwald discussed the command's research progress and future plans for CREW program activities in support of Surface Force crew fatigue initiatives during an upcoming deployment. — *Danielle Cazarez*



DAYTON, Ohio (Jan. 24, 2024) Capt. Walter Dalitsch III, Naval Medical Research Unit Dayton Commanding Officer, recognizes Lt. Alexandra Kaplan from the Naval Aerospace Medical Research Laboratory as the Command's 2023 Junior Officer of the Year. — *Zach Wilson*

SAN DIEGO (April 22, 2024) Sailors and staff with Naval Health Research Center took part in a foreign object disposal walk for Earth Day 2024, cleaning up trash and debris from the command and in neighborhoods in the surrounding community. — *Danielle Cazarez*



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SAN ANTONIO (Jan. 24, 2024) Cmdr. Rachel Werner, acting chief and science director, Naval Medical Research Unit San Antonio, briefs Force Master Chief Patrick Paul Mangaran, director, Hospital Corps, U.S. Navy Bureau of Medicine and Surgery, and his staff, on the unit's mission and capabilities during Mangaran's visit to the Tri-Service Research Laboratory.

—Burrell Parmer



SILVER SPRING, Md. (Feb. 28, 2024) Assistant Secretary of Defense for Health Affairs Dr. Lester Martinez-Lopez (right) receives a brief from Tom Dunn (left), on the Naval Medical Research Command's advanced medical development capabilities. — Tommy Lamkin



GROTON, Conn. (April 24, 2024) Staff of Naval Submarine Medical Research Laboratory join together to participate in and recognize Denim Day 2024, a worldwide annual day of solidarity for sexual assault prevention. — Emily Swedlund



SIGONELLA, Italy (Feb. 26, 2024) Rear Adm. Guido F. Valdes (left), commander, Naval Medical Forces Pacific, holds a hybrid all-hands call with Naval Medical Research Unit EURAFCENT. — Cullen Munger

